IN THE CLAIMS:

Please amend the claims to read as follows:

1. (Currently amended) A method for producing a layer of functional molecules on a carrier surface of a substrate, using S-layer proteins as a carrier of the functional molecules, comprising the steps of:

providing a carrier surface;

providing a solution containing S-layer proteins in the form of monomers or oligomers;

bringing the solution into contact with the carrier surface of said substrate and providing a reference electrode in the solution;

depositing a layer of S-layer proteins on the carrier surface at first electrochemical conditions on the carrier surface, said electrochemical conditions being controlled by applying a first electrochemical potential to the substrate with respect to said reference electrode; and

forming a two-dimensional crystalline structure in the layer of S-layer proteins thus deposited, resulting in a fixing of the S-layer proteins at second electrochemical conditions on the carrier surface said electrochemical conditions being controlled by applying a second electrochemical potential to the substrate with respect to said reference electrode. [[;]]

~~wherein one of the steps comprises the step of forming functional molecules on the S-layer proteins;~~

~~wherein the step of depositing the layer of S-layer proteins comprises the step of setting first electrochemical conditions at an electrochemical boundary layer on the carrier surface and the step of forming the two-dimensional crystalline structure comprises the step of setting second electrochemical conditions at the electrochemical boundary layer on the carrier surface, said second electrochemical conditions being different from said first electrochemical conditions; and~~

~~wherein said step of forming the two-dimensional crystalline structure and fixing the S-layer~~

~~proteins is electrochemically controlled by applying an electrical potential to the substrate with respect to a reference electrode provided in the solution.~~

Claims 2 and 3. (Canceled)

4 (Currently amended) The method as described in Claim 1, ~~characterized in that, to change the electrochemical conditions between deposition and crystallization~~, wherein between the steps of depositing a layer of S-layer proteins and forming of a crystalline structure, at least one chemical parameter of the solution is varied.

5. (Currently amended) The method as described in Claim 1, ~~characterized in that, to change the electrochemical conditions between deposition and crystallization,~~ wherein between the steps of depositing a layer of S-layer proteins and forming of a crystalline structure, at least one electrochemical parameter of the solution is varied.

Claims 6 and 7. (Canceled)

8. (Currently amended) The method as described in Claim 1, ~~characterized in that,~~ wherein in at least one of the steps of depositing ~~deposition of~~ the S-layer proteins ~~and/or the formation~~ and forming of [[the]] a crystalline structure ~~structures~~, a conformation change of the S-layer proteins occurs~~, in particular a denaturing or renaturing~~.

9. (Currently amended) The method as described in Claim 1, ~~characterized in that~~ wherein at least one of the steps of depositing ~~deposition of~~ the S-layer proteins ~~and/or the formation~~ and forming of [[the]] a crystalline structure are controlled by a time-varied electrochemical potential [[curve]].

10. (Currently amended) The method as described in Claim 1, ~~characterized in that the deposition of the~~ wherein depositing a layer of S-layer proteins ~~on the substrate~~ is carried out in a first solution and forming ~~the formation~~ of [[the]] a crystalline structure is carried out in a second solution.

11. (Currently amended) The method as described in Claim 10, ~~characterized in that~~ wherein a net

charge is electrostatically ~~impressed on~~ applied to the ~~substrate~~ carrier surface before ~~dipping into~~ it is brought into contact with the first solution and said net charge is maintained until it is brought into contact with the second solution ~~during the run through the solutions~~.

12. (Currently amended) The method as described in Claim 10, ~~characterized in that~~ wherein a net charge is electrochemically ~~impressed on the substrate~~ applied to the carrier surface in the first solution and ~~is kept when the solutions are changed~~ said net charge is maintained until it is brought into contact with the second solution.

13. (Previously presented) The method as described in Claim 10, characterized in that the change of solutions happens by transport of the carrier surface from a first solution bath for the deposition to a second bath for the crystallization.

14. (Currently amended) The method as described in Claim 1, characterized in that functional molecules are bonded to S-layer proteins even before the deposition of the S-layer proteins, and thereupon the functional molecules are deposited on the substrate ~~simultaneously with the deposition of~~ together with the S-layer proteins.

15. (Canceled)

16. (Currently amended) The method as described in Claim 1, characterized in that, after the formation of the crystalline structure in the ~~S-layer stratum~~ layer of S-layer proteins, functional molecules are deposited on the substrate at ~~positions defined by~~ bonding sites of the crystalline structure.

17. (Currently amended) The method as described in Claim 1, characterized in that, after the formation of the crystalline structure in the ~~S-layer stratum~~ layer of S-layer proteins, electrochemical nanoparticles are deposited on the substrate at ~~positions defined by~~ bonding sites of the crystalline structure.

18. (Currently amended) The method according to claim 1, wherein the ~~deposition of the S-layer~~

~~proteins and the forming of the crystalline structure are~~ the electrochemical potential of the substrate is controlled potentiostatically.

19. (Canceled)

20. (New) The method as described in claim 8, wherein the conformation change is denaturing of S-layer proteins

21. (New) The method as described in claim 8, wherein the conformation change is renaturing of S-layer proteins.